CPTO

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1. (AMENDED) A method of producing an improved organism having a desirable trait, the method comprising:

a) obtaining an initial population of organisms,

b) generating a set of mutagenized organisms, from the initial population, wherein non-stochastic genetic mutations are represented in the set of mutagenized organisms, [such that when all the genetic mutations in the set of mutagenized organisms are taken as a whole, there is represented a set of substantial genetic mutations,] and

c) [detecting the presence of said] identifying the desirable trait exhibited by one of the set of mutagenized organisms, thereby producing the improved organism.

Claims 2-10 (Original)

2. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of a knocking out of at least 15 different genes.

3. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of a knocking out of at least 50 different genes.

4. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of a knocking out of at least 100 different genes.

5. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of an introduction of at least 15 different genes.

6. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of an introduction of at least 50 different genes.

7. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of an introduction of at least 100 different genes.

8. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of an alteration in the expression of at least 15 different genes.

9. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of an alteration in the expression of at least 50 different genes.

10. The method of claim 1, wherein the set of substantial genetic mutations in step b) is comprised of an alteration in the expression of at least 100 different genes.

11. (AMENDED) A method of producing an improved organism having a desirable trait, the method comprising:

a) obtaining an initial population of organisms,

b) generating a set of mutagenized organisms from the initial population, each having at least one genetic mutation, wherein non-stochastic genetic mutations are represented in the set of mutagenized organisms [such that when all the genetic mutations in the set of mutagenized organisms are taken as a whole, there is represented a set of substantial genetic mutations]

c) detecting the manifestation of at least two genetic mutations which contribute to the desired trait,

d) introducing the at least two detected genetic mutations into one organism, and

e) optionally repeating any of the steps, thereby producing an improved organism having a desirable trait [a), b), c), and d)].

Claims 12-20 (Original)

12. The method of claim 11, wherein step d) is comprised of a knocking out of at least 15 different genes in one organism.

13. The method of claim 11, wherein step d) is comprised of a knocking out of at least 50 different genes in one organism.

14. The method of claim 11, wherein step d) is comprised of a knocking out of at least 100 different genes in one organism.

15. The method of claim 11, wherein step d) is comprised of an introduction of at least 15 different genes into one organism.

16. The method of claim 11, wherein step d) is comprised of an introduction of at least 50 different genes into one organism.

17. The method of claim 11, wherein step d) is comprised of an introduction of at least 100 different genes into one organism.

18. The method of claim 11, wherein step d) is comprised of an alteration in the expression of at least 15 different genes in one organism.

19. The method of claim 11, wherein step d) is comprised of an alteration in the expression of at least 50 different genes in one organism.

20. The method of claim 11, wherein step d) is comprised of an alteration in the expression of at least 100 different genes in one organism.

21. (AMENDED) A method for identifying a gene that alters a trait of an organism, the method comprising:

a) obtaining an initial population of organisms,

b) generating a set of mutagenized organisms from the initial population of organisms, wherein non-stochastic genetic mutations are represented in the set of mutagenized organisms [such that when all the genetic mutations in the set of mutagenized organisms are taken as a whole, there is represented a set of substantial genetic mutations,] and

c) identifying a mutagenized organisms exhibiting the altered trait [detecting the presence an organism having said altered trait], and

d) determining the nucleotide sequence of a gene having the genetic mutation [a gene that has been mutagenized] in the organism identified in step (c), thereby identifying the gene that alters the trait of the organism [having the altered trait].

22. (AMENDED) A method for producing an organism with an improved trait, the method comprising:

a) functionally knocking out an enogenous gene in a substantially clonal population of organisms;

b) transferring a library of altered genes into the substantially clonal population of organisms, wherein each altered gene differs from the endogenous gene at only one codon to produce a popoulation of mutagenized organisms;

c) detecting a mutagenized organism having an improved trait, thereby producing an organism with an improved trait. [; and

d) determining the nucleotide sequence of an gene that has been transferred into the detected organism.]

23. (NEW) The method of any one of claims 1, 11, 21 or 22, wherein the trait is selected from the group of: an ability to produce a substance, an ability to not produce a substance, an increased ability to produce a substance, a decreased ability to produce a substance, viability under pre-defined conditions, non-viability under pre-defined conditions, altered behavior, change in growth rate, change in size, change in morphology, an alteration in a morphological characteristic, and any combination thereof.

24. (NEW) The method of any one of claims 1, 11, 21 or 22, wherein the improved trait comprises differential activation of selected inactive gene products in the organism.